EXHIBIT 18

Potential Impact of the Deepwater Horizon Oil Spill on Commercial Fisheries in the Gulf of Mexico

Article *in* Fisheries · July 2011

DOI: 10.1080/03632415.2011.589334

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Potential Impact of the *Deepwater Horizon* Oil Spill on Commercial Fisheries in the Gulf of Mexico

A. McCrea-Strub

Postdoctoral Fellow, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada
E-mail: a.strub@fisheries.ubc.ca

K. Kleisner

Postdoctoral Fellow, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada

U. R. Sumaila

Associate Professor, Director of the Fisheries Economics Research Unit, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada

W. Swartz

Ph.D. Student, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada

R. Watson

Senior Research Fellow, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada

D. Zeller

Senior Research Fellow, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada

D. Pauly

Professor, Principal Investigator, *Sea Around Us* Project, Fisheries Centre, University of British Columbia, Vancouver, BC, Canada

ABSTRACT: *Given the economic and social importance of fisheries in the Gulf of Mexico large marine ecosystem (LME), it is imperative to quantify the potential impacts of the Deepwater Horizon oil spill. To provide a preliminary perspective of the consequences of this disaster, spatial databases of annual reported commercial catch and landed value prior to the spill were investigated relative to the location of the fisheries closures during July 2010. Recent trends illustrated by this study suggest that more than 20% of the average annual U.S. commercial catch in the Gulf has been affected by postspill fisheries closures, indicating a potential minimum loss in annual landed value of US$247 million. Lucrative shrimp, blue crab, menhaden, and oyster fisheries may be at greatest risk of economic losses. Overall, it is evident that the oil spill has impacted a highly productive area of crucial economic significance within the Gulf of Mexico LME. This study draws attention to the need for ongoing and thorough investigations into the economic impacts of the oil spill on Gulf fisheries.*

Impacto potencial del derrame petrolero *Deepwater Horizon* en las pesquerías comerciales del Golfo de México

RESUMEN: En virtud de la gran importancia económica y social que tiene la actividad pesquera en el gran ecosistema marino (GEM) del Golfo de México, es indispensable cuantificar los potenciales impactos del derrame petrolero *Deepwater Horizon*. Con la finalidad de tener una perspectiva preliminar de las consecuencias de este siniestro, se investigaron datos espaciales anualizados de la captura comercial y valor desembarcado antes del derrame en relación a la localización de las vedas espaciales durante julio de 2010. Las tendencias actuales que se ilustran en este trabajo sugieren que más del 20% de la captura comercial anual promedio en la parte del golfo correspondiente a los EEUU, ha sido afectada por vedas establecidas después del derrame, lo que indica una pérdida mínima en valor de desembarque de $247 millones de dólares. Las pesquerías más rentables como el camarón, cangrejo, sábalo y ostión pueden estar en riesgo de sufrir pérdidas económicas. En general, se vuelve evidente que el derrame ha impactado un área altamente productiva de primera importancia económica dentro del GEM del Golfo de México. La presente contribución llama la atención en la necesidad de desarrollar investigaciones vigentes y profundas sobre los impactos económicos del derrame petrolero en las pesquerías del golfo.

Introduction

The explosion of the Deepwater Horizon offshore drilling rig on April 20, 2010, initiated the world's largest known accidental oil spill in the Gulf of Mexico Large Marine Ecosystem (LME), a region valued for its high productivity and lucrative fisheries (Adams et al. 2004; Sherman and Hempel 2008). Estimates of the quantity of oil, natural gas and associated methane, and chemical dispersants released as a result of this calamity have been plagued by uncertainty. The U.S. Government–appointed team of scientists—the Flow Rate Technical Group—estimated that a total of 4.9 million barrels of oil was released from the Macondo well,[1] though an independent study suggested that the amount was between 4.16 and 6.24 million barrels (Crone and Tolstoy 2010). According to British Petroleum's (BP) records, approximately 1.8 million gallons[2]

[1] "U.S. Scientific Teams Refine Estimates of Oil Flow from BPs Well Prior to Capping", August 2, 2010, http://www.restorethegulf.gov/release/2010/08/02/us-scientific-teamsrefine-estimates-oil-flow-bps-well-prior-capping

[2] "One Year Later Press Pack", April 4, 2011, http://www.restorethegulf.gov/release/2011/04/10/one-year-later-press-pack

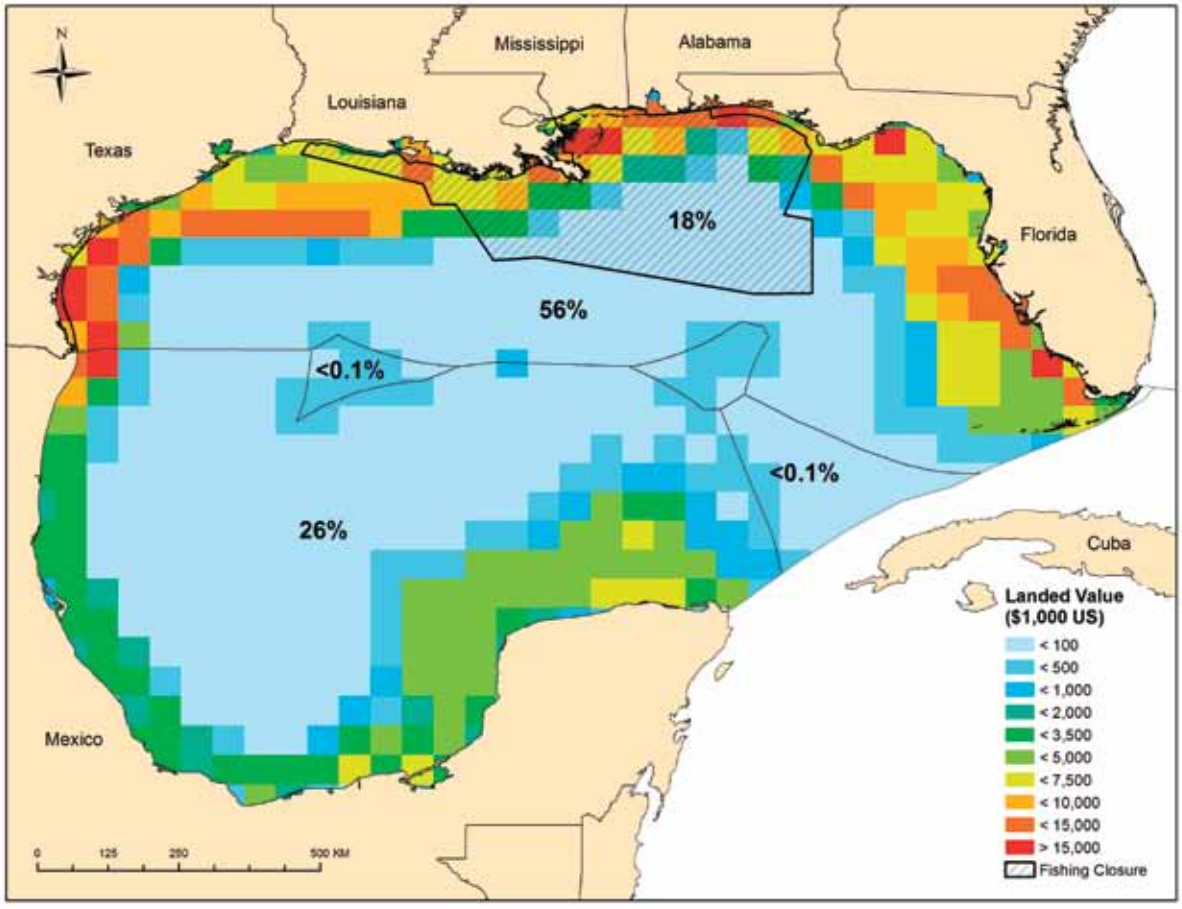

Figure 1. Spatial distribution of the average (2000–2005) annual landed value of reported commercial fisheries catches in the Gulf of Mexico LME. The area closed to commercial fishing (including both federal and state within the U.S. EEZ as of July 22, 2010) accounts for approximately 18% of the total value of landings within the LME. The remainder of the U.S. EEZ still open to fishing accounts for 56%, and Mexican waters account for 26% of total landed value. Less than 0.1% of the annual landed value is derived from the two high seas areas and Cuban waters.

On May 2, 2010, twelve days following the explosion of the *Deepwater Horizon* oil rig, the U.S. National Oceanic and Atmospheric Administration (NOAA), as well as the states of Florida, Alabama, Mississippi, and Louisiana, began to declare portions of federal and state waters closed to commercial fishing in an effort to protect seafood safety and ensure consumer confidence.[4] As of July 22, 2010, over 10% of the total surface area of the Gulf of Mexico LME and approximately 24% of the U.S. Gulf EEZ and territorial state waters were closed to commercial fishing operations. During 2000 to 2005, habitats located within the boundaries of the closed area yielded commercial catches comprising approximately 17% of the total annual tonnage and 18% of the total annual value of reported landings within the Gulf of Mexico LME (Figure 1).

The visible extent of the oil spill and resultant closures indicates that consequences will be greatest for U.S. fisheries. On average, 22% of the annual U.S. commercial catch in the Gulf and 24% of the corresponding annual landed value were derived from the area closed to fishing, representing a potential minimum annual loss of $247 million. Though the majority of U.S. catch within the boundaries of the fisheries closure was composed of Gulf menhaden, landings of brown and white shrimp generated the greatest value (12% of the annual U.S. total in the Gulf), followed by blue crabs (4%), Gulf menhaden (3%), and eastern oysters (1%; Table 1). Economically valuable invertebrate fisheries may be most at risk due to the fact that relatively sessile, benthic organisms are likely to suffer higher initial rates of mortality and exhibit long recovery times as a result of exposure to oil-saturated habitats compared to more mobile fish species (Teal and Howarth 1984; Carls et al. 2001; Culbertson et al. 2007, 2008a).

This study does not pretend to address the full range of biological and economic consequences of the *Deepwater Horizon* oil spill on fisheries in the Gulf of Mexico. It is assumed here that the effects of the spill will be confined spatially to

[4] http://sero.nmfs.noaa.gov/deepwater_horizon_oil_spill.htm

TABLE 1. Average (2000–2005) annual commercial fisheries catch and landed value by zone within the Gulf of Mexico LME, including total and taxa-specific estimates (BS = brown shrimp, WS = white shrimp, BC = blue crab, GM = Gulf menhaden, EC = Eastern oyster).

		Catch (1,000 tons)						Landed value (US$1,000,000)					
Zone	Area (1,000 km^2)	Total	BS	WS	BC	GM	EO	Total	BS	WS	BC	GM	EO
U.S., open	550	513	29	25	20	343	51	767	175	152	134	126	47
U.S., closed	167	147	10	10	6	93	16	247	57	64	39	34	15
Mexico	741	191	1	1	6	9	45	358	5	3	29	3	45
Cuba	57	0	0	0	0	0	0	1	0	0	0	0	0
High Seas	36	1	0	0	0	0	0	1	0	0	0	0	0
Total LME	1,550	852	40	35	32	445	111	1,376	219	219	202	163	106

the extent of the fisheries closures within U.S. waters and will only last one year. However, the Gulf of Mexico LME is a hydrographically dynamic system, and the existence of a large subsurface oil plume provides evidence that impacts are likely to extend beyond the visible surface boundaries (Camilli et al. 2010). Most marine organisms, including those mentioned here, exhibit daily and seasonal, small- and large-scale migrations both laterally and vertically. Species may be directly impacted by physical contact with contaminants, as well as indirectly affected via the fouling of important nursery and spawning habitats and trophic interactions (Jackson et al. 1989; Peterson et al. 2003). The ability of critical coastal habitats, including salt marshes and mangroves, to act as long-term reservoirs of oil due to buried hydrocarbon deposits can extend exposure and subsequent biological recovery times by up to 40 years (Culbertson et al. 2007, 2008a, 2008b). The capacity of habitats and species to recover from the effects of oil, methane, and dispersants may have already been compromised due to preexisting sources of stress, including nutrient-laden freshwater discharge from the Mississippi River resulting in periodic oxygen-depleted "dead zones" (O'Connor and Whitall 2007; Rabalais et al. 2007), as well as bycatch and habitat destruction due to extensive trawling (Vidal-Hernandez and Pauly 2004; Wells et al. 2004). Additionally, impacts on ecosystems and reductions in the quantity and quality of fisheries resources translate to a variety of economic impacts, including losses in revenue, profit, wages, and jobs. Therefore, the possible future loss to commercial fisheries in the United States is suggested as a minimum estimate and provides a preliminary perspective given pre–oil spill trends. This analysis includes only reported commercial landings; illegal, unreported, and unregulated (IUU) fishing as well as lucrative recreational fishing is not considered.

Despite limitations associated with the spatial resolution of the databases, this study indicates that the oil spill is clearly impacting an area of crucial economic importance within the Gulf of Mexico. Continued analyses such as those presented here should shed light on an uncertain future.

Acknowledgements

This contribution is part of the *Sea Around Us* Project, a collaboration between the Pew Environmental Group and the University of British Columbia.

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